

CLAIMS

1. An illumination device, comprising:

a waveguide having a predetermined length with a light-receiving surface and a light-emitting surface;

an elongated light source positioned adjacent to the light-receiving surface of said waveguide and extending substantially along the length of said waveguide; and

a scattering cap secured to the light-emitting surface of said waveguide and extending substantially along the length of said waveguide, said scattering cap receiving light transmitted through the waveguide from said light source and scattering said light to create a substantially uniform light intensity pattern along a lateral surface of said scattering cap.

2. The illumination device as recited in claim 1, and further comprising a housing positioned adjacent to said waveguide and enclosing the light-receiving surface of said waveguide.

3. The illumination device as recited in claim 2, wherein said elongated light source is also enclosed within said housing.

4. The illumination device as recited in claim 1, wherein said elongated light source is a multiplicity of spaced point light sources arranged in a line extending along the light-receiving surface of said waveguide.

5. The illumination device as recited in claim 4, wherein said point light sources are light-emitting diodes.

6. The illumination device as recited in claim 1, wherein the lateral surface of said scattering cap is curved to simulate a neon or fluorescent tube.

7. The illumination device as recited in claim 1, wherein light is transmitted through said waveguide to the scattering cap through total internal reflection.

8. The illumination device as recited in claim 3, wherein light is transmitted through said waveguide to the scattering cap through total internal reflection.

9. The illumination device as recited in claim 2, wherein said housing includes a pair of side walls engaging side surfaces of said waveguide and defining an open-ended channel that extends substantially the predetermined length of said waveguide.

10. The illumination device as recited in claim 9, wherein said housing further includes a floor portion connecting said side walls so that the housing has a substantially U-shape.

11. The illumination device as recited in claim 2, wherein space between the elongated light source and said housing is filled with a potting compound.

12. The illumination device as recited in claim 1, and further comprising a protective shield applied to and encapsulating said waveguide and said scattering cap.

13. The illumination device as recited in claim 1, and further comprising a protective sleeve that encases the entire illumination device, except for the lateral surface of the scattering cap.

14. The illumination device as recited in claim 1, wherein said scattering cap is a thin coating applied to the light-emitting surface of said waveguide.

15. The illumination device as recited in claim 1, wherein said scattering cap has a channel defined therethrough, said channel being filled with an adhesive material, thus allowing the scattering cap to be secured to said waveguide.

16. An illumination device, comprising:

- a waveguide having a predetermined length with a light-receiving surface and a light-emitting surface;
- an elongated light source positioned adjacent to the light-receiving surface of said waveguide and extending substantially along the length of said waveguide;
- a housing positioned adjacent to said waveguide and enclosing the light-receiving surface of said waveguide;
- a scattering cap secured to the light-emitting surface of said waveguide and extending substantially along the length of said waveguide, said scattering cap receiving light

transmitted through the waveguide from said light source and scattering said light to create a substantially uniform light intensity pattern along a lateral surface of said scattering cap; and a protective shield applied to and encapsulating the waveguide, housing, and scattering cap.

5 17. The illumination device as recited in claim 16, wherein said protective shield is a wear-resistant coating applied to and encapsulating the waveguide, housing, and scattering cap.

18. The illumination device as recited in claim 16, wherein said elongated light source is a multiplicity of light-emitting diodes.

10

19. An illumination device, comprising:

a waveguide having a predetermined length with a light-receiving surface and a light-emitting surface;

an elongated light source positioned adjacent to the light-receiving surface of said waveguide and extending substantially along the length of said waveguide;

15 a housing positioned adjacent to said waveguide and enclosing the light-receiving surface of said waveguide;

a scattering cap secured to the light-emitting surface of said waveguide and extending substantially along the length of said waveguide, said scattering cap receiving light transmitted through the waveguide from said light source and scattering said light to create a substantially uniform light intensity pattern along a lateral surface of said scattering cap; and

20 a protective sleeve that encases the entire illumination device, except for the lateral surface of the scattering cap.

20. The illumination device as recited in claim 19, wherein said elongated light source is a multiplicity of light-emitting diodes.